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Research Article

Oral health change in Iran: Part IV Jumping to dental caries free schools

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Abstract

Purpose: This paper presents the results of the first three years of the implementation of this program.

Methods: First, an agreement was signed between the two ministries for the promotion of oral and dental health among elementary school students. Then, some executive strategies were selected within this agreement including the promotion of human resource providing prevention services, the improvement of infrastructure by increasing the number mobile dental clinic vehicles and oral health posts at schools with mobile units, the improvement of standards for health centers by providing surgical restoration services and the removal of irreparable teeth, and the insurance coverage of rural areas and townships with less than 20,000 population. The objectives of the program were evaluated at data, process and output levels and the initial results were assessed in terms of the enhancement of students' awareness and prevention service coverage.

Results: Prevention service coverage reached over 80 percent in the first three years of the program implementation, and the infrastructure has been grown greatly. The short-term effects of the program are evident.

Conclusion: Students oral health program has had great achievements in the improvement of prevention services at school level.

Introduction

Dental caries is a multifactorial disease that can be prevented [1,2]. It has a wide range of prevalence around the world and there are different models for its control. However, despite improvements both in people's awareness of the disease and in its control in the world, it is still of high prevalence [3]. In this respect, the implementation of the prevention programs for children is of a major priority. School provides a good opportunity to access the children since most children at the age range of 6-14 years are available at schools. As well, the training of school staff and parents triggers a wave of knowledge about dental caries prevention across the society [4, 5]. On the other hand, the permanent first and second molar teeth are among the most susceptible teeth to dental caries whilst they appear at school ages [6]. According to a national survey, the permanent first molar tooth is one of the teeth most frequently suffering from dental caries [7]. The preventive measures like brushing twice a day [8], controlled consumption of caries-causing sugars [9], varnish fluoride therapy [10, 11], sealant therapy [12, 13], and regular examinations are effective in preventing dental caries.

Training and empowering health service providers in primary healthcare centers greatly contribute to the improvement of the coverage of oral and dental care services. Also, oral health posts with mobile units can provide children with dental disease prevention services at school sites [16, 17]. The mobile dental clinic vehicles can be used to provide services at schools in deprived areas [18, 19, 20]. Oral Health Change Plan (OHCP) is implemented in Iran to improve oral health services. One of the sub-plans of OHCP is to promote oral health among elementary school students as Students Oral Health Promotion Plan(SOHPP). This paper addresses the achievements of this sub-plan at elementary schools in three years.

Methods

Intersectoral collaboration promotion

A key process in Students Oral Health Promotion Plan (SOHPP) has been to sign an agreement between the Ministry of Health and Medical Education and the Ministry of Education for the provision of training, prevention and dental treatment services and research at school level. The agreement allows healthcare providers and dentists to perform oral health activities at school sites. The agreement D/101/1737 was signed by the respective ministers on March 17, 2015.

Infrastructure reinforcement

According to the rules of health care development, there is one health care provider per 2500 people, one school-level oral health post per 5000-7000 students, and one dentist in health center per 15000 people to provide prevention and dental treatment services (Plate 1).

Full insurance coverage of dental services

As an attempt to alleviate the inequalities and promote justice in healthcares, the OHCP -defined services are fully covered by insurance to be provided free of charge for the people in rural areas and the cities with less than 20,000 population, while in urban areas, the prevention services are free, but the dental treatment services are not free.

Referral system

The health centers are equipped so that students who need surgical tooth restoration services or the removal of irreparable teeth can be referred by the school to these centers to receive the required dental treatments.

Mobile dental clinic vehicles in schools of deprived areas

In regions where health centers are far from people's residential area, mobile dental clinic vehicles can be used to provide dental services (Plate 2).

Program monitoring and evaluation

The program monitoring was done by collecting data recorded in the electronic system with respect to the status of equipment and service coverage and also in order to its validation, a checklist including 23 items was prepared for school site at input, process and output levels and a valid questionnaire that its reliability coefficient was estimated with Cronbach's alpha to be 0.8. To explore the effect of the program on students' knowledge and skill about oral health, they were randomly sampled and were tested with a pre-test and then, a post-test after two months of training. The final results are evaluated by DMFT indicator for 12-year-old children. It is derived five years after the program according to the WHO-defined protocol [21]. This indicator was 2.09 at the beginning of the

Plate 1: School oral health posts equipped with mobile and fixed units at schools

Plate 2: Mobile dental clinic vehicles to provide dental services in deprived regions

Table 1. Promotion of new skills among healthcare providers in the field of oral healthcare services at health network level

Year	Training of new skills and certifying the validation					
	Skill in providing varnish fluoride therapy		Skill in electronic registration of oral health data		Risk assessment and classification of oral diseases	
	No.	Percent	No.	Percent	No.	Percent
2014-2015	38515	77.8	31557	63.7	31557	63.7
2015-2016	45200	91	41210	83	41210	83
2016-2017	49500	98	49500	98	49500	98

Table 2. The outcome of students oral health promotion plan during the first three years of the implementation

Outcome	2014-2015	2015-2016	2016-2017
Varnish fluoride therapy coverage once every six months for the elementary school children at the age of 6-14 years	85%	83%	86%
Yearly screening examination coverage as well as the establishment of electronic files for the elementary school children at the age of 6-14 years	0%	98%	98%
Frequency of fissure-sealant therapy supply to the elementary school children at the age of 6-9 years	50000	340000	1051969
Number of oral health posts at elementary schools	70	650	1100
Number of mobile dental clinic vehicles	0	14	94

program and is aimed to reach DMFT = 1.5 for 12-year-old children by 2022.

Results

This section presents the results of the first three years of the program. According to Table 1, human resource development with new role in dental caries prevention services delivery is evident.

According to Table 2, over 80 percent of elementary school students enjoyed the varnish fluoride therapy services during the first three years after the program initiation. Also, more than 90 percent of the students underwent annual oral and dental screening examinations and electronic files were opened for them. A very good growth was observed in fissure sealant therapy services in the first three years. As is evident in Table 1, the establishment of school oral health posts where mobile units are used has grown significantly in the first three years and also increasingly growth was seen about mobile dental clinic vehicles.

Table 3. DMFT and caries-free indicators for 12-year-old children in 2012 and 2015

Index	2012	2015
DMFT	2.09	1.84
Caries-free index	35%	39.78%

Table 4. Mean scores for awareness of educational content of the book *oral health hints* and SD before and after training among 12-year-old students of the elementary schools

Question	Before training			After training		
	number	Mean score	SD	number	Mean score	SD
1. What is the consequence of flossing? (a) Cleaning the space between the teeth (b) Creating space between the teeth (c) Gum wounding (d) Gum bleeding	550	0.91	0.274	549	0.98	0.140
2. What is a good brush? (a) Brush with thick and hard hair (b) Brush with thick, short and long hair (c) Brush with flexible, soft hair (d) Brush with soft, irregular and regular hair	550	0.86	0.339	549	0.96	0.187
3. Which one is more responsible for dental caries? (a) Eating three pieces of candies at once (b) Eating three pieces of candies at different times, e.g., once every hour (c) No difference (d) I don't know.	550	0.84	0.366	549	0.95	0.200
4. Which of the food items is more responsible for dental caries? (a) Milk (b) Cheese and walnut (c) Fruits (d) Candy	550	0.75	0.431	549	1	0.000
5. What are the benefits of fluoride for teeth? (a) It whitens the teeth. (b) It removes microbes. (c) It strengthens the teeth. (d) It strengthens the gums.	550	0.76	0.425	549	0.94	0.231
6. How long after the use of varnish fluoride, teeth can be brushed? (a) After two days (b) After one hour (c) After one day (d) After five hours	550	0.65	0.474	549	0.95	0.212
7. How does fluoride-containing toothpaste influence teeth? (a) It strengthens teeth against caries. (b) It causes attrition of teeth. (c) It removes dental plaque. (d) It removes the stains on teeth.	550	0.91	0.282	549	0.98	0.140
8. Which of the following is responsible for bad breath? (a) Not caring oral and dental health (b) Gum diseases (c) Infected teeth with caries (d) All items	550	0.39	0.488	549	0.96	0.187
9. What is the hardest part of the tooth? (a) The core (b) Enamel (c) Dentin (d) Root	550	0.17	0.379	549	0.77	0.414

Table 5. Means comparison of the scores for awareness of educational content of the book oral health hints and SD before and after training among 12-year-old students of the elementary schools

Question	Mean pre-training score	Mean post-training score	t	df	Sig.
1. What is the consequence of flossing? (a) Cleaning the space between the teeth (b) Creating space between the teeth (c) Gum wounding (d) Gum bleeding	0.91	0.98	4.69	1097	0.0001
2. What is a good brush? (a) Brush with thick and hard hair (b) Brush with thick, short and long hair (c) Brush with flexible, soft hair (d) Brush with soft, irregular and regular hair	0.86	0.96	5.81	1097	0.0001
3. Which one is more responsible for dental caries? (a) Eating three pieces of candies at once (b) Eating three pieces of candies at different times, e.g., once every hour (c) No difference (d) I don't know.	0.84	0.95	6.61	1097	0.0001
4. Which of the food items is more responsible for dental caries? (a) Milk (b) Cheese and walnut (c) Fruits (d) Candy	0.75	1	13.41	1097	0.0001
5. What are the benefits of fluoride for teeth? (a) It whitens the teeth. (b) It removes microbes. (c) It strengthens the teeth. (d) It strengthens the gums.	0.76	0.94	8.71	1097	0.0001
6. How long after the use of varnish fluoride, teeth can be brushed? (a) After two days (b) After one hour (c) After one day (d) After five hours	0.65	0.95	13.26	1097	0.0001
7. How does fluoride-containing toothpaste influence teeth? (a) It strengthens teeth against caries. (b) It causes attrition of teeth. (c) It removes dental plaque. (d) It removes the stains on teeth.	0.91	0.98	4.99	1097	0.0001
8. Which of the following is responsible for bad breath? (a) Not caring oral and dental health (b) Gum diseases (c) Infected teeth with caries (d) All items	0.39	0.96	25.65	1097	0.0001
9. What is the hardest part of the tooth? (a) The core (b) Enamel (c) Dentin (d) Root	0.17	0.77	25.21	1097	0.0001

Improvement of the dental caries reduction can be seen for 12-year-old children in 2012 and 2015. 12-year-old children in 2012 and 2015 as is evident in Table 3.Improvement of the student oral health knowledge is other valuable effects of the student program based on Table 4 and according to Table 5 this improvement was significant.

Discussion

Schools are a great place to provide dental caries prevention services because of the presence of most school-age children. The use of schools as a site for the implementation of oral and dental health interventions is among the priorities of health promotion. It has been shown that schools can be a good choice to manipulate children's behavior towards positive oral and dental actions [22, 23]. The results of the first three years of the program implementation reveal that Students Oral Health Promotion Plan (SOHPP) has been very successful in improving training and prevention infrastructure and services. The use of oral health workforce plays a key role in improving the service coverage at schools [24, 25]. Given the shortage of oral health workforce, training and certifying workforce for the supply of oral disease prevention services have resulted in the significant increase in the human force required for the improvement of training and prevention services. Varnish fluoride is an effective caries prevention measure within school-based oral health programs [26]. The present study shows a very good growth in the supply of this service at the studied schools. Mobile

clinics are cost-effective measure for sealant therapy services at schools [27, 28]. OHCP has greatly improved the supply of mobile dental clinics for the schools in the deprived regions. Sealant therapy is also an effective caries prevention services in school-based oral and dental health intervention programs [29]. This has showed a good growth for the children at the age of 6-9 years in school-based program. Health education is also important for the improvement of positive oral health behaviors at schools [30,31].

Conclusion

According to the results, school-based oral health program is a good approach to access target population of oral health for the provision of oral disease prevention services.

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